

Tectonic geomorphology and neotectonics of the Kyaukkyan Fault, Myanmar

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The Kyaukkyan Fault is a dextral strike-slip fault, part of a complex zone of active dextral transpression that absorbs most of the northward motion of India relative to Sundaland. While much of the strike-slip displacement is localised in western Myanmar and along the prominent Sagaing Fault, significant dextral shear also occurs across the Kyaukkyan Fault, on the Shan Plateau in the east.

The largest recorded earthquake in Myanmar occurred on the Kyaukkyan Fault in 1912, near Maymyo (M_w 7.7), but the fault has generated little significant seismicity since then. Despite its demonstrated seismic potential and remarkable topographic expression, the fault's neotectonic history remains poorly known.

Interpretation of ≤ 30 m Landsat TM/ETM+ images, together with field investigations, reveals deformation features developed along the Kyaukkyan Fault system, mostly indicative of Quaternary dextral strike-slip faulting. Well-marked fault scarps and valleys locate the fault especially in its northernmost and southernmost part; geomorphic features related with Kyaukkyan Fault activity are sag ponds, shutter ridges, offset and beheaded streams, triangular facets and low-sinuosity mountain fronts. Geomorphic markers of young fault activity such as offset and deformed alluvial fans, wind-gaps were also identified during field observation.

The fault's central section is characterised by a complex pull-apart system, whose normal border faults show signals of relatively slow neotectonic activity. In the central part of the basin, deformation of Quaternary sediments by a locally-buried cross-basin fault system includes dip-slip faulting, where subsidence adjacent to linear ridges is suggested by notably active mountain fronts, dextral strike-slip faulting and local transpression. Although no direct evidence of a 1912 surface rupture has been detected, the fresh geomorphic expression of the cross-basin fault system indicates that it is likely to have been the focus of that event.

Paleoseismological trenching currently underway on the cross-basin fault aims to confirm the 1912 rupture trace, and to delimit the Kyaukkyan Fault's earthquake recurrence interval in order to reveal its modern seismic hazard, fundamental to define the seismic zonation of the area.